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Cotswold Homes Limited

Agricultural Land Classification and Soil Resources

at

Land off Biddestone Lane, Yatton Keynell, Wiltshire

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1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Cotswold Homes Limited to investigate the Agricultural Land Classification (ALC) and soil resources of land off Biddestone Lane, Yatton Keynell, Wiltshire, by means of a detailed survey of soil and site characteristics.
- 1.2 Guidance for assessing the quality of agricultural land in England and Wales is set out in the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for grading the quality of agricultural land¹, and summarised in Natural England's Technical Information Note (TIN) 049².
- 1.3 Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. The principal physical factors influencing grading are climate, site and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.
- 1.4 Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use. Grade 2 is very good quality agricultural land, with minor limitations which affect crop yield, cultivations or harvesting. Grade 3 land has moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield, and is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Grade 4 land is poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields. Grade 5 is very poor quality land, with very severe limitations which restrict use to permanent pasture or rough grazing.
- 1.5 Land which is classified as Grades 1, 2 and 3a in the ALC system is defined as best and most versatile (BMV) agricultural land.
- 1.6 As explained in Natural England's TIN049, the whole of England and Wales was mapped from reconnaissance field surveys in the late 1960s and early 1970s, to provide general strategic guidance on agricultural land quality for planners. This Provisional Series of maps was published

¹ **MAFF (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.* MAFF Publications.

² **Natural England (2012).** *Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land,* Second Edition.

on an Ordnance Survey base at a scale of One Inch to One Mile (1:63,360). The Provisional ALC map shows the site as undifferentiated Grade 3. However, TIN049 explains that:

"These maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance. They show only five grades: their preparation preceded the subdivision of Grade 3 and the refinement of criteria, which occurred after 1976. They have not been updated and are out of print. A 1:250 000 scale map series based on the same information is available. These are more appropriate for the strategic use originally intended..."

- 1.7 TIN049 goes on to explain that a definitive ALC grading should be obtained by undertaking a detailed survey according to the published guidelines, at an observation density of one boring per hectare. This survey follows the detailed methodology set out in the MAFF guidelines.

2 Site and climatic conditions

General features, land form and drainage

- 2.1 The site comprises one arable field parcel of 4.3ha, located on the south-west side of the settlement of Yatton Keynell. The site is otherwise bounded to the north-west by Biddestone Lane, to the south by other agricultural land and to the south-east by land under trees and scrub.
- 2.2 The topography of the site is largely level at around 120m above Ordnance Datum (AOD).
- 2.3 Drainage of the site is primarily through the soil profile. There is a pond south of the centre of the site. There is no mapped flood risk³.

Agro-climatic conditions

- 2.4 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point data set at a representative altitude of 120m AOD, and are given in Table 1. The climate at the site is wet and relatively warm. Moisture deficits are moderate. The number of Field Capacity Days is larger than is average for lowland England (150) and is unfavourable for providing opportunities for agricultural field work. There is no climatic limitation to the agricultural land quality.

³ **Environment Agency (2025).** *Flood map for planning*. <https://flood-map-for-planning.service.gov.uk/location>

Table 1: Local agro-climatic conditions

Parameter	Value
Grid Reference	ST 86600 75900
Average Annual Rainfall	880mm
Accumulated Temperatures >0°C	1,404 day°
Field Capacity Days	191 days
Average Moisture Deficit, wheat	88mm
Average Moisture Deficit, potatoes	76mm

Soil parent material and soil type

- 2.5 The underlying geology mapped by the British Geological Survey⁴ across the site belongs to the Forest Marble Formation, consisting of greenish-grey, variably calcareous silicate mudstone with some variable Limestones. No superficial deposits are mapped at the site.
- 2.6 The Soil Survey of England and Wales soil association mapping⁵ (1:250,000 scale) shows the Evesham 1 association across the site. The main soils comprise slowly permeable calcareous clays, but shallow, brashy soils over limestone may also appear. The former are seasonally waterlogged, in Wetness Class (WC) III and the latter are well drained, in WC I⁶.

3 Agricultural land quality

Soil survey methods

- 3.1 Five soil profiles were examined using an Edelman (Dutch) auger at an observation density of one per hectare in accordance with the established recommendations for ALC surveys². One soil pit was also excavated to examine subsoil structures and stone content. The locations of observations are indicated on Figure RAC/10753/1. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:

- soil texture;
- stone content;

⁴ **British Geological Survey (2025).** *BGS Geology Viewer*, <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

⁵ **Soil Survey of England and Wales (1984).** *Soils of South West England* (1:250,000), Sheet 5

⁶ **Findlay et al (1984).** *Soils and Their Use in South West England*. Soil Survey of England and Wales Bulletin 14, Harpenden.

- colour (including localised mottling);
- consistency;
- structural condition;
- free carbonate; and
- depth.

- 3.2 One topsoil sample was submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are presented in Appendix 1.
- 3.3 Soil WC was determined from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling, and slowly permeable subsoil layers at least 15cm thick, in relation to the number of Field Capacity Days at the location.
- 3.4 Soil droughtiness was investigated by the calculation of moisture balance equations (given in Appendix 2). Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs.

Agricultural land classification and site limitations

- 3.5 Assessment of agricultural land quality has been carried out according to the revised ALC guidelines¹. Soil profiles have been described according to Hodgson⁷ which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.
- 3.6 Agricultural land quality across the site is limited variably by soil wetness, influenced heavily by the large number of FCD and clayey topsoil textures. Both of the soil variations of the Evesham 1 association are present.
- 3.7 There is one main topsoil type across the site, comprising heavy clay loam or clay of around 24cm average depth. The topsoil is very dark greyish brown or dark greyish brown (10YR3/2 or 10YR4/2 in the Munsell soil colour charts⁸), slightly stony to stoneless, and slightly calcareous. The structure is weak medium subangular blocky and the consistency is friable.

⁷ **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

⁸ **Munsell Color (2009).** *Munsell Soil Color Book*. Grand Rapids, MI, USA

- 3.8 In the north of the site, the subsoil comprises brown (10YR5/3) passing to grey (10YR5/1) clay horizons. The subsoil is increasingly calcareous with depth, and increasingly stony. The subsoil is mottled throughout and is gleyed, but permeable. The profile is in WC II, and with heavy clay loam topsoil is limited by wetness to Subgrade 3a.
- 3.9 Across the centre of the site, the subsoil is also mottled, calcareous brown (10YR5/3) clay but is very stony with abundant limestone. Large tabular limestone was encountered in the pit at around 35cm. The subsoils are gleyed but permeable and these profiles are also in WC II. However the clay topsoil results in a wetness limitation to Subgrade 3b.
- 3.10 Across the south of the site, there is an upper subsoil of greyish brown or brown (10YR5/2 or 10YR5/3) heavy clay loam which is stoneless and mottled. In the vicinity of the pond, the subsoil is slowly permeable from immediately beneath the topsoil. There is a lower subsoil of grey (10YR5/1) clay which is also mottled, gleyed and slowly permeable. The profiles were observable to depths of 41-85cm before being impeded by increasing stone content. There may be limestone at depth. As both profiles have slowly permeable subsoils, they are in WC IV and are limited by wetness to Grade 4.
- 3.11 The ALC distribution within the site is shown in Figure RAC/10753/2 and the areas of each grade are given in Table 2. Photographs taken at the site are given in Appendix 3.

Table 2: ALC areas

Grade	Description	Area (ha)	% of agricultural land
Subgrade 3a	Good quality	0.9	21
Subgrade 3b	Moderate quality	1.6	37
Grade 4	Poor quality	1.8	42
	Total Agricultural	4.3	100

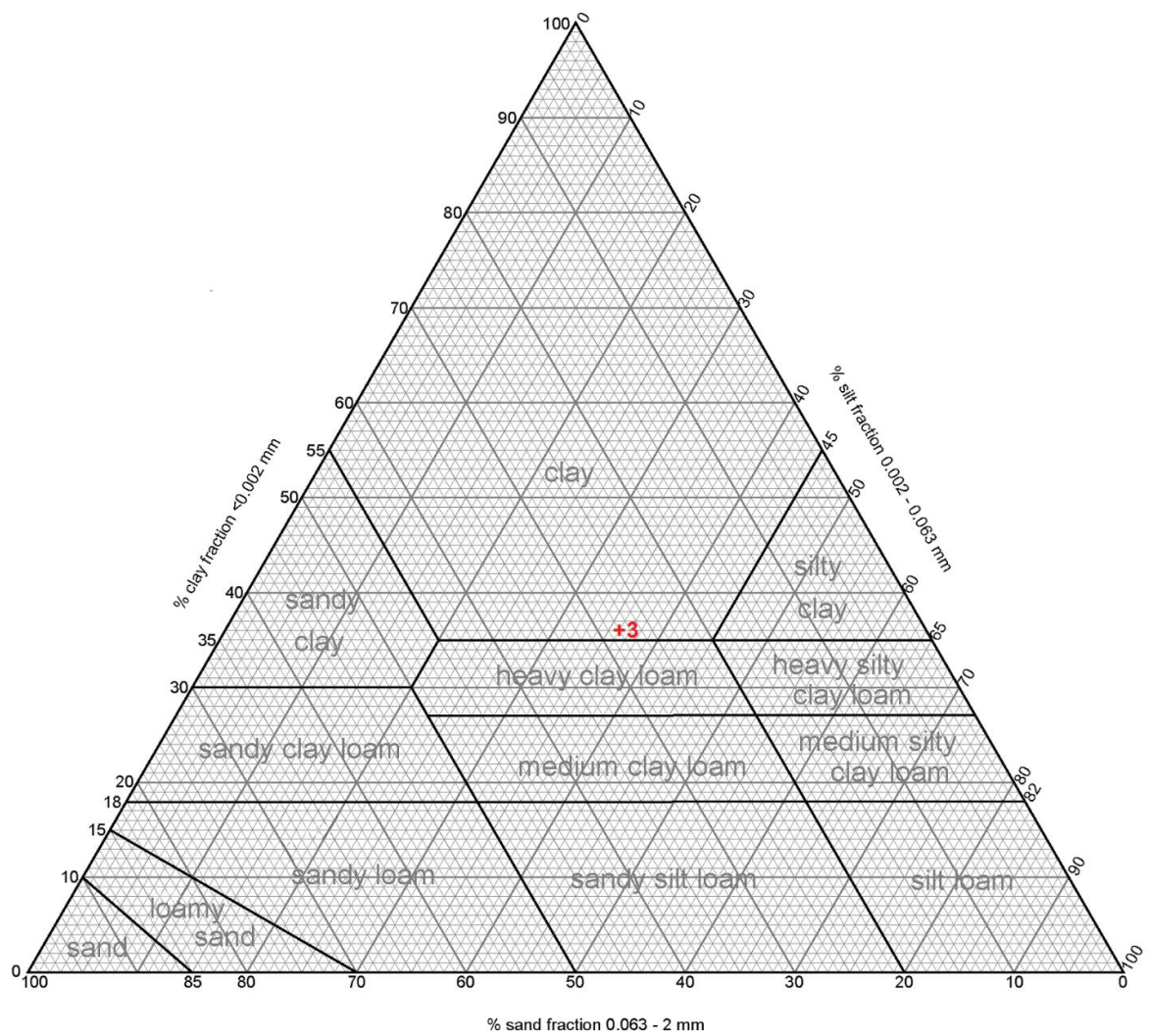
Appendix 1: Laboratory Data

Determinand	Site 3	Units
Sand 2.00-0.063 mm	28	% w/w
Silt 0.063-0.002 mm	36	% w/w
Clay <0.002 mm	36	% w/w
Organic Matter	5.7	% w/w
Texture	Clay	

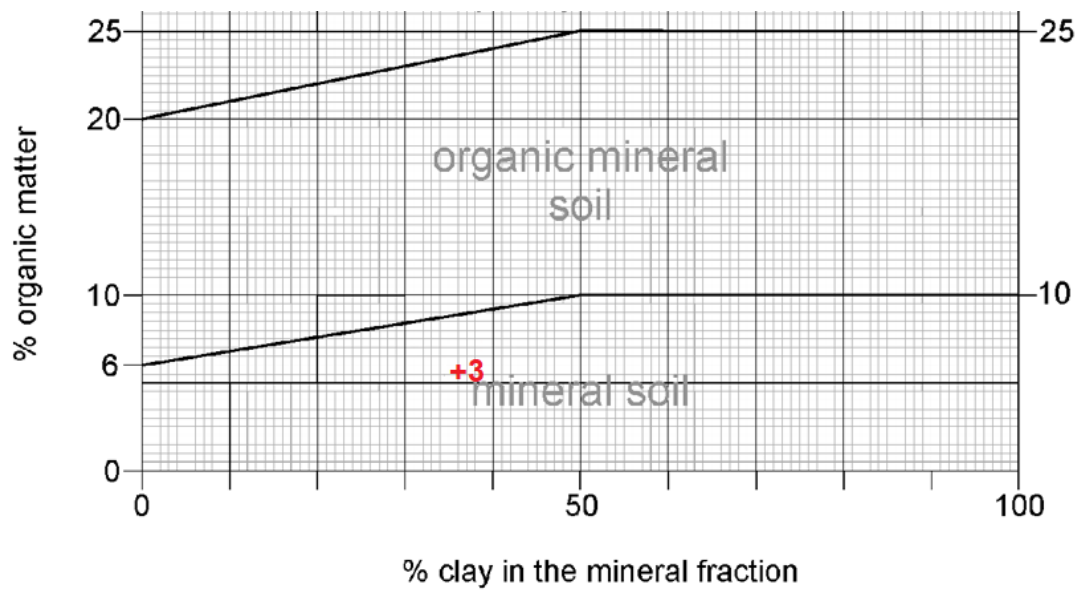
Determinand	Site 3	Units
Soil pH	8.0	
Phosphorus (P)	18.9	mg/l (av)
Potassium (K)	110	mg/l (av)
Magnesium (Mg)	40.0	mg/l (av)

Determinand	Site 3	Units
Phosphorus (P)	2	ADAS Index
Potassium (K)	1	ADAS Index
Magnesium (Mg)	1	ADAS Index

Soil Texture by Particle Size Analysis



Organic Matter Class



Appendix 2: Soil Profile Summaries and Droughtiness Calculations

Wetness / workability limitations are determined according to the methodology given in Appendix 3 of the ALC guidelines, MAFF 1988

Droughtiness calculations are made according to the methodology given in Appendix 4 of the ALC guidelines, MAFF 1988.

Grades are shown for drought, wetness and any other soil or site factors which are relevant. The overall Grade is set by the most limiting factor and shown on the right.

Stone types			Climate Data		Wetness Class Guidelines					Climate		
%	TA _v	E _{av}	MDwheat	88	SPL within 80cm, gleying within 40cm		II	III	IV	V	1404 D° Limitation Grade 1	
hard	1	0.5	MDpotato	76	SPL within 80cm, gleying at 40-70cm		>69cm	<69cm				
Lstone	4	3	FCD	191	No SPL but gleying within 40cm		coarse subsoil	I	other cases	II		
hard	flint & pebble		AAR	880	Maximum depth of auger penetration is <u>underlined</u>							

Site No.		Depth cm	Texture	CaCO ₃	Colour	Mottle colour	abund- ance	stone% hard	stone% Lstone	Struct- ure	APwheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)
1	T	0	24		10YR3/2			0	0		43	43	n	n	<i>IV</i>	4	4	WE
		24	43		10YR5/3	Fe	com	0	0		30	30	y	n				
		43	85	mod	10YR5/1	Fe	com	0	2	poor	33	35	y	y				
		<u>85</u>	120	mod	10YR5/1	Fe	com	0	30	poor	20	0	y	y				
										Total	127	108						
										MB	39	32						
										Droughtiness grade (DR)	1	1						
2	T	0	28	sli	10YR4/2			0	5		48	48	n	n	<i>IV</i>	4	4	WE
		28	41	sli	10YR5/2	Fe	com	0	0	poor	16	16	y	y				
		<u>41</u>	70	mod	10YR5/2	Fe	com	0	30	poor	21	30	y	y				
		70	120	Lstone							15	0	n	n				
										Total	99	93						
										MB	11	17						
										Droughtiness grade (DR)	2	1						
3 Pit	T	0	23	C	sli	10YR4/2		0	12		36	36	n	n	<i>II</i>	3b	3b	WE
		23	35	C	sli	10YR5/3	Fe	com	0	40	13	13	y	n				
		<u>35</u>	60	C	mod	10YR5/3	Fe	com	0	60	18	22	y	n				
		60	120	Lstone							18	4	n	n				

															Total			85	75			
															MB			-3	-1			
															Droughtiness grade (DR)			3a	2			
4	T	0	20	C	sli	10YR4/2			0	18	-	29	29	n	n	//	3b	3b	WE			
	T	20	25	C	sli	10YR4/2			0	40		6	6	n	n							
		25	60	C	mod	10YR5/3	Fe	com	0	50		31	35	y	n							
		60	120	Lstone								18	4	n	n							
																Total			84	74		
															MB			-4	-2			
															Droughtiness grade (DR)			3a	2			
5	T	0	23	hCL	sli	10YR4/2			0	5	-	40	40	n	n	//	3a	3a	WE			
		23	38	C	sli	10YR5/3	Fe	com	0	1		24	24	y	n							
		38	48	C	mod	10YR5/1	Fe	com	0	15		14	14	y	n							
		48	60	C	mod	10YR5/1	Fe	com	0	40		8	13	y	n							
		60	120	Lstone								18	4	n	n							
															Total			104	95			
															MB			16	19			
															Droughtiness grade (DR)			2	1			

Appendix 3: Photographs



Pit 1



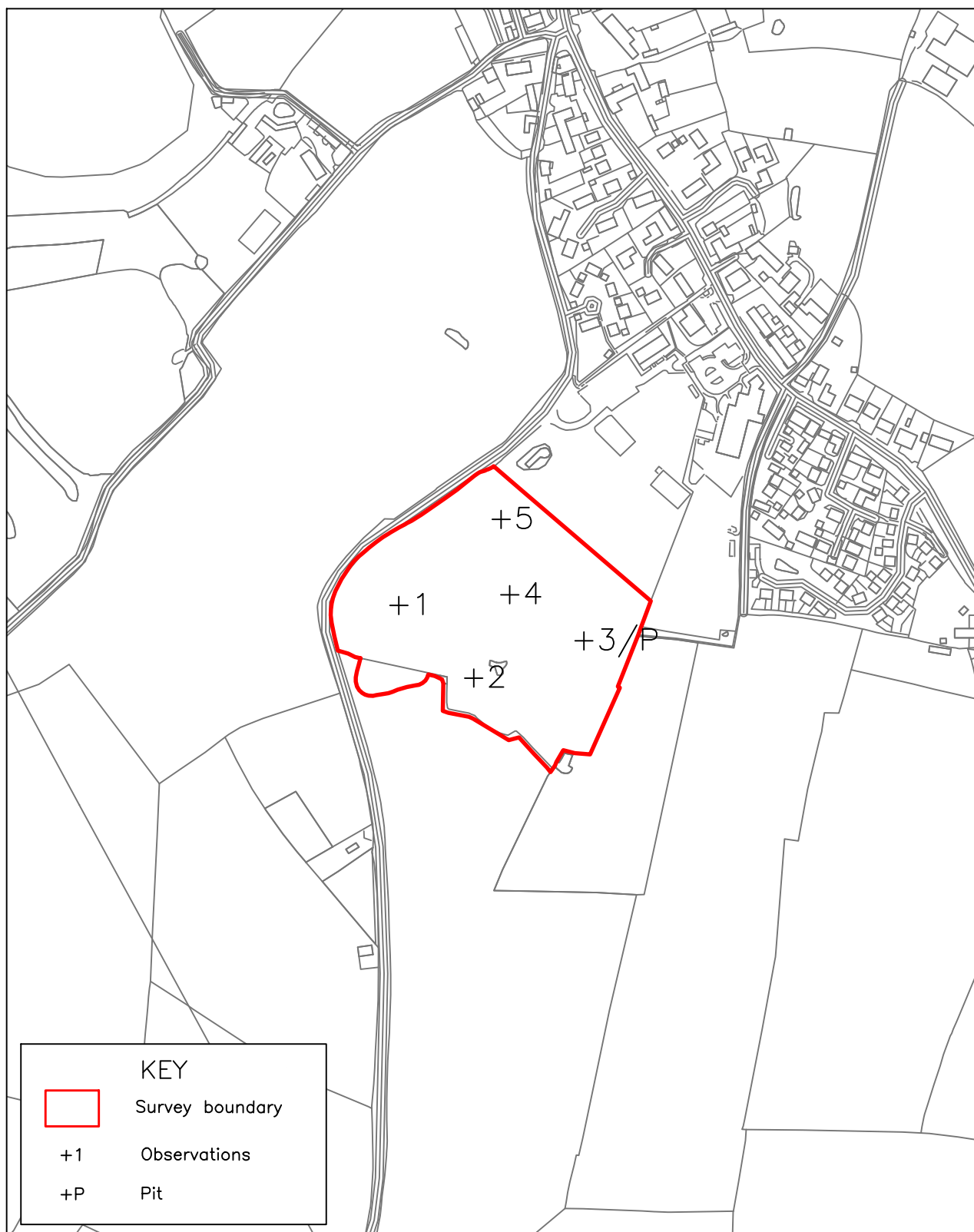
Pit fragmented limestone base



Pit topsoil



Pit subsoil



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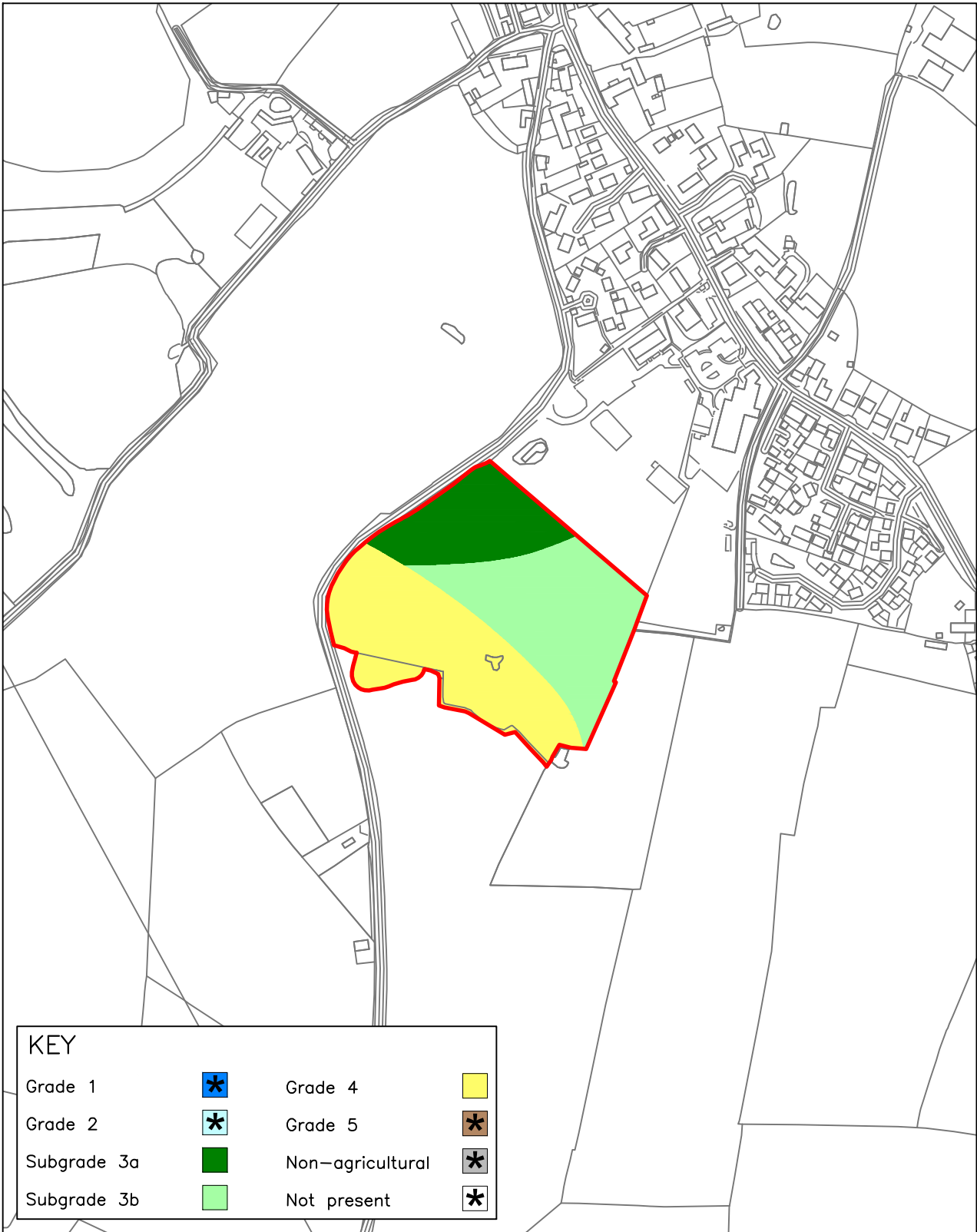
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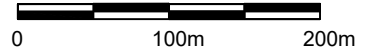


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